In the Claims

Please amend the claims as follows:

1. (Currently amended) An image data processing method of automatic adaptation of 3-D surface Model to image features, for Model-based image segmentation, the method comprising:

creating a deformable tubular mesh model for fitting a 3-D path based on a centerline of a 3-D tubular object of interest, the 3-D path comprising a set of ordered points defining a plurality of path segments, the mesh model having an initial radius and comprising a plurality of mesh segments corresponding to the plurality of path segments; and

automatically adapting a length of a mesh radius of each mesh segment based on ~~a radius of local curvature of the corresponding path segment and~~ a product of the initial radius and a shrinking factor, the shrinking factor determined based on the initial radius and a radius of local curvature of the corresponding path segment.

2. (Previously presented) The image processing method of claim 1, wherein creating the deformable tubular mesh model comprises:

creating a tubular structure for fitting the 3-D path; and

mapping the tubular structure onto a 3-D surface of the tubular object of interest, which is represented in a gray level 3-D image.

3. (Previously presented) The image processing method of claim 1, further comprising:

computing the 3-D path that corresponds to a the centerline of a the tubular object of interest and defining the path segments on the 3-D path;

creating an initial straight deformable cylindrical mesh model, of any kind of mesh, having a length along a longitudinal axis equal to a length of the 3-D path;

dividing the initial mesh model into segments of length corresponding to the path segments of the 3-D path; and

computing, for each mesh segment of the initial mesh model, a rigid-body transformation that transforms an initial direction of the mesh segment into a direction of the corresponding path segment of the 3-D path, and applying the transformation to corresponding vertices of the mesh segment.

4. (Previously presented) The image processing method of claim 3, further comprising:

blending the rigid-body transformations of consecutive mesh segments.

5. (Previously presented) The image processing method of claim 4, further comprising:

computing rotations for the rigid-body transformations of consecutive mesh segments,

wherein a linear interpolation is used between rotations of the consecutive mesh segments for blending the 3-D rigid body transformations to limit self-intersections between bent portions of the deformable tubular mesh model.

6. (Previously presented) The image processing method of claim 1, wherein automatically adapting a mesh radius comprises:

modulating the initial radius of the deformable tubular mesh model according to a local curvature of the 3-D path to limit self-intersections between bent portions of the deformable tubular mesh model.

7. (Previously presented) The image processing method of claim 6, further comprising:

approximating the local curvature; and

applying a radius modulation technique comprising one of linear blending or bi-cubic spline interpolation from one radius to another.

8. (Previously presented) The image processing method of claim 1, further comprising:

determining a 3-D rotation comprising computing a minimal 3-D rotation from an initial mesh direction to a target segment to minimize mesh torsion.

9. (Previously presented) The image processing method of claim 8, wherein determining the 3-D rotation further comprises:

defining rotation between segments using an axis parameter and a rotation angle parameter; and

computing the parameters iteratively between adjacent segments so that a new rotation for a current segment comprises a composition of a found rotation for a previous segment and the minimal rotation from the previous segment to the current segment.

10. (Previously presented) A medical viewing system comprising:

means for acquiring 3-D medical image data of a 3-D object of interest having substantially tubular parts;

a suitably programmed computer or a special purpose processor having circuit means arranged to process the image data according to the method as claimed in claim 1; and

display means to display the medical images.

11. (Previously presented) A medical examination apparatus comprising:

means to acquire a three-dimensional image of an organ of a body, the organ having substantially tubular parts; and

a medical viewing system according to claim 10.

12. (Canceled)

13. (Previously presented) The image processing method of claim 2, wherein the deformable tubular model is created with one of 2-simplex meshes or triangular meshes.

14. (Previously presented) A method of automatically adapting a three-dimensional surface model of a substantially tubular object, the method comprising:

determining a three-dimensional path corresponding to a centerline of the tubular object;

defining a plurality of path segments on the three-dimensional path;

creating an initial straight deformable cylindrical mesh model having a length equal to a length of the three-dimensional path;

dividing the initial mesh model into a plurality of mesh segments corresponding to the plurality path segments;

computing a rigid-body transformation for each mesh segment for transforming an initial direction of each mesh segment into a path direction of the corresponding path segment;

applying the rigid-body transformation for each mesh segment to corresponding vertices of the mesh segment; and

adapting a mesh radius of each mesh segment based on a product of an initial radius of the initial mesh model and a shrinking factor, the shrinking factor being determined based on at least a radius of curvature and a length of the corresponding path segment.

15. (Previously presented) The method of claim 14, further comprising:

performing linear blending on the rigid-body transformations of consecutive mesh segments.

16. (Previously presented) The method of claim 14, wherein adapting the mesh radius of each mesh segment comprises reducing a diameter of the deformable cylindrical mesh model in highly curved portions of the three-dimensional path.

17. (Currently amended) A computer readable medium for storing a computer program executable to process data for automatic adaptation of a three-dimensional surface model to image features, the computer readable medium comprising:

a mesh model code segment for creating a deformable tubular mesh model for fitting a three-dimensional path based on a centerline of a 3-D tubular object of interest, the three-dimensional path comprising a set of ordered points defining a plurality of path segments, the

mesh model having an initial radius and comprising a plurality of mesh segments corresponding to the plurality of path segments; and

a radius adapting code segment for automatically adapting a length of a mesh radius of each mesh segment based on a product of the initial radius and a shrinking factor, the shrinking factor determined based on a radius of local curvature of the corresponding path segment and the initial radius.